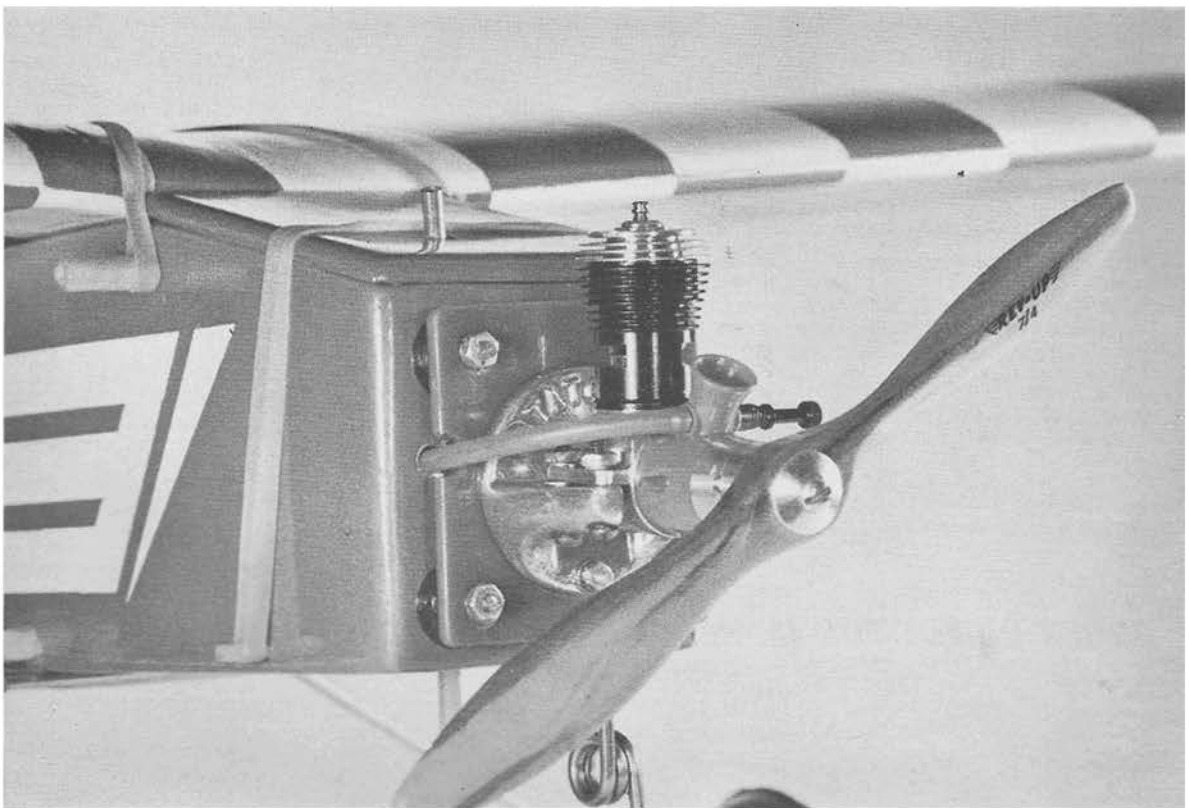


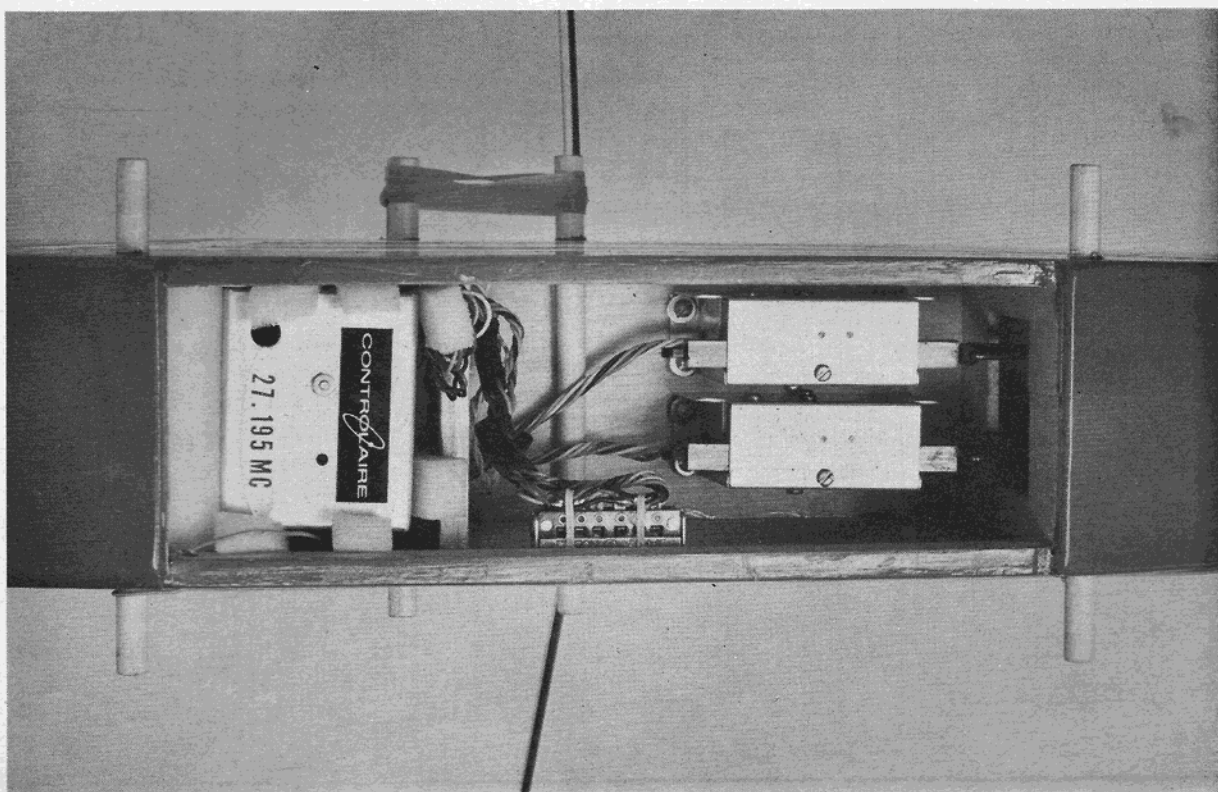
Royal Coachman



by DON DEWEY

There are several ways to discourage a beginner in this hobby and sport — one is to start him out with a ship that takes forever to build, the second is to provide him with a radio system that either takes a decade of tinkering to keep in working condition long enough to get to the field, or contains so many potential control functions that he is tempted to build General Frank Savage's 'Picadilly Lilly' as his first project.

It has long been this writer's opinion that the ideal combination for the newcomer to R/C would be a ship that could be built in one weekend at a minimum of expense, that would be inherently much stronger than the average model, and that would utilize a maximum of six channels of control. The Royal Coachman is all of these things — a model that can be completed (less paint) in two evenings, is rugged enough to withstand the initial pilot errors, and designed for rudder and elevator control (motor is optional — we didn't use it) with a six channel reed rig. The author has long felt that the six channel rig offers the beginner the most for the money and will give him many, many months of flying pleasure with maximum performance and reliability. Our prototype utilized the new Controilaire 6 which can be purchased for \$100 and will last until you are ready for the additional controls offered by a ten channel rig or one of the new proportional





Royal Coachman and friend. Short, 41" span makes for a small, easy to handle ship...

systems. We purposely designed this model to accommodate two Ancco, or Royal servos — both were utilized in the prototype. A Cox Medallion .09 was used for power and subsequent flight tests proved the Royal Coachman to be an outstanding multi trainer that can be handled by the tyro with an absolute minimum of dual instruction from a more experienced club member.

And then we removed the .09 and installed an O.S. Max .15... the 41" span ship was now about as docile as a Me 109! If you're a beginner, stick to the .09. If you've past the shaking, quaking stage, dust off the .15 — whatever your choice, you'll find the Royal Coachman offers more flying pleasure with less hassle than any ship you've built.

Design Notes

The Royal Coachman is no raving beauty — it wasn't intended to be. Rather, it was conceived as a fast-building, functional, and serviceable design that could withstand much more abuse than the average multi ship. The design formula itself was taken directly from 'R/C Design Made Easy' by Chuck Cunningham in the March 1965 issue of RCM. Having selected a 41" span with a 7½" chord, which gave us the desired 5.5:1 aspect ratio, we arrived at the airfoil configuration in a most scientific manner — we hunted through a stack of old model magazines until we found one that was the right size! A Cox Medallion .09 was selected for its availability, cost, and dependability.

Insofar as the construction goes, the Royal Coachman is all-sheet through-

out. Standard sheet and strip sizes have been used, and all accessory items are readily available. Silk covering is optional — it depends on whether you habitually land on the strip or in the trees. The prototype was completely silk covered although it is not at all necessary. (I keep telling myself it was only to find out how much weight it would add!).

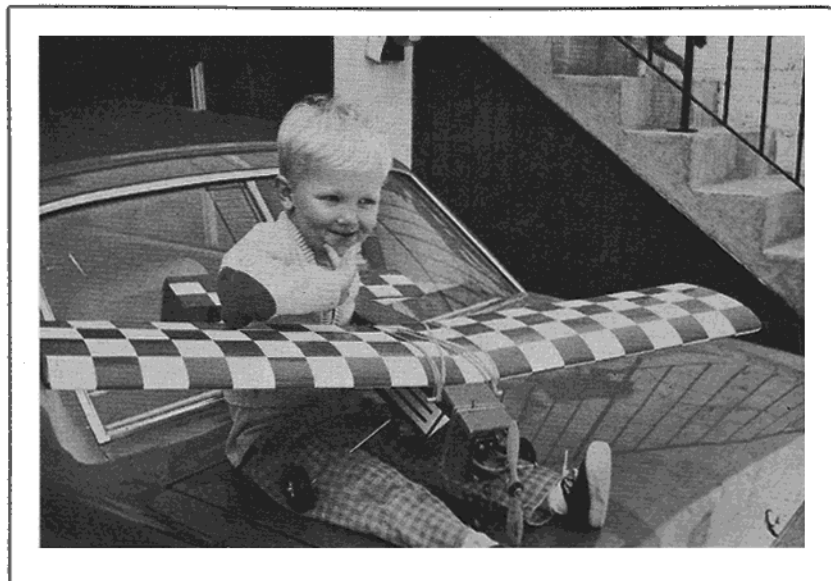
Construction

The majority of construction articles advise the builder to begin with the wing. This is done for two reasons — first most modelers dislike building wings; secondly open structure, silk covered wings take time for the dope to completely cure. Since this is all sheet and nothing has to cure, we'll start with the fuselage.

The method of building the fuselage was "borrowed" from Phil Kraft. Phil uses this quick-build idea on a design of his we have dubbed the 'Nasti-Stik.' First, cut a piece of 1/8"

plywood 2¾" wide by 107/8" long and secure it to your building surface. Butt glue to the end of this a 2¾" wide piece of 1/8" balsa sheet, 12½" long, using white glue. This forms the fuselage bottom. Now cut a plank of 4" wide, 3/16" sheet to the length shown on the plans for the stabilizer and cap the ends with two pieces of 3/8" wide, 3/16" strip stock, 4" long. Mark a center line on this piece and glue it at right angles to the other two. You now have the fuselage bottom and stab completed. Draw a center line down the entire conglomeration.

Cut two fuselage sides from hard 1/8" x 4" wide stock. Glue the vertical grained 3/8" doublers in place in the nose section with contact cement. Add the 1/8" x 1/2" x 7" wing rests. (We use white glue for plywood to balsa joints, Hobbypoxy glue for firewalls and high-stress joints, and Testors "A" for the balance. And if you think the latter fast drying cement is for repairs only, give it a try — you'll be surprised!) Now cut out the three main bulkheads, mark off their location on the fuselage bottom, glue in place (with the exception of the firewall) and hold securely with masking tape until dry. Check with a triangle to make sure they are exactly vertical. Now glue the fuselage sides in place, both to the formers, and to the fuselage bottom, but only as far back as the last former. Again, hold in place with masking tape. When this assembly is dry pull the tail section together at the center line (yeah... that's why



...or a large, awkward one. It all depends upon your point of view!

the center line!), insert a piece of $\frac{3}{4}$ " wide tapered trailing edge stock for a tail post, and glue together, gluing the sides to the bottom as you go. Add the $\frac{1}{8}$ " ply firewall with Hobby-poxy epoxy glue. While this is drying, cut out the fin and glue in place on top of the stab. Take a piece of 3" wide, $\frac{1}{8}$ " sheet, cut a slot in it for the fin, and glue in place on top of the sides. Be sure to apply glue liberally around the fin at the slotted area. Your fuselage is now completed except for the hatch cover. Fibreglass the nose area and sand well.

Add the elevator (cut from tapered T.E. stock) and the fin — we used the mylar hinge and toothpick route. Sand well. Brush on three or four coats of butyrate. Cover with silk if you so desire. Finish the clear doping (with occasional light sanding) as desired, and paint. We sprayed on two coats of Aero Gloss white, stripped off a few areas with $\frac{1}{4}$ " wide masking tape, then sprayed on two coats of Aero Gloss Stearman red. Drill $\frac{1}{4}$ " holes and add hold-down dowels. Measure off the area you need for your receiver and add a "spacer" bulkhead to form a receiver compartment.

The motor mount use for both the Cox .09 and the Max .15 was a $2\frac{1}{2}$ " x $2\frac{1}{4}$ " piece of $\frac{1}{8}$ " thick phenolic. For the Cox .09 use a Tatone radial mount bolted directly to the phenolic. For the Max .15 we replaced the four crankcase bolts with 3-48 bolts cut to size. Add the fixed nose gear, which happens to be a standard Midwest nose gear from a Hustler Delta kit. (Available at most hobby dealers as a Midwest accessory item). The phenolic motor mount is then bolted to the firewall with four 4-40 bolts and four standard faucet washers available from the local hardware store. These faucet washers not only act as spacers, but absorb engine vibration and also allow you to adjust your side and down thrust by tightening down the 4-40 bolts and thus compressing the washers. Three degrees of down and two degrees of right thrust proved adequate.

A dmeco two ounce clank tank fits the fuel and battery compartment quite well. Drill a hole in the plywood

fuselage bottom for the overflow vent and one in the hatch for the filler tube. A short length of copper tubing soldered to the filler vent tube will facilitate fueling. Five 600 mah nicad pencells were used as a battery pack and fit quite nicely under the fuel tank.

If you use two Ancco servos, mount them upright to the plywood fuselage bottom with 3-48 bolts and blind mounting nuts. $1/16$ " wire and $\frac{1}{4}$ " square balsa pushrods were used along with DuBro Kwik Links and DuBro keepers.

The main gear is a standard Top Flite 'Tauri' gear. This item is available at many hobby shops — if not, write Top Flite, and tell Sid or Mike that Don sentcha. That, along with a buck and a half should be good for one Tauri landing gear...

Wheels are $2\frac{1}{2}$ " DuBro with a $2\frac{1}{4}$ " Air Span nose wheel. Adjust for negative rake by bending the main gear closer together... a most scientific method to compensate for any design or building errors.

The fuselage is done — and if it took you over one good evening's work, you "musta did it backwards."

The wing is of all sheet construction. Begin by gluing two sheets of $3/32$ " balsa together — one sheet 6" wide and the other $1\frac{1}{2}$ " wide. Or, if you prefer, one 4" sheet and one $3\frac{1}{2}$ " sheet. Use Ken Willard's method — that is, make sure the sheets match, add strips of masking tape to one side, add glue to the seam line, lay flat on the work table, wipe off excess glue, then add strips of tape to the second side. Set aside to dry. Make two panels, $20\frac{1}{2}$ " long, in this fashion. Make the two top panels about $\frac{1}{2}$ " wider, or 8", to allow for the curvature of the airfoil. Mark off the position of the ribs on each panel. Cut the ribs from $3/32$ " sheet. The two center section ribs are from $\frac{1}{4}$ " or $\frac{3}{8}$ " stock, whichever is handy. Glue the leading and trailing edges in place on the bottom wing skin. Locate the position of the $\frac{1}{4}$ " square bottom spar, glue the ribs in place, then add the top spar. Repeat this process for the opposite wing panel.

Allow both panels to dry, then add the top sheeting. Be sure to let the entire wing assembly dry before removing from the workbench. When completely dry, sand off the overhang

on each end. Add the $\frac{1}{4}$ " sheet wing-tips. Block up each wingtip $1\frac{3}{4}$ " and hold the center sections parallel to the edge of your workbench. Now sand the required dihedral into these center section ribs. Lay down a piece of Saran Wrap or waxed paper and join the two panels with Hobby-poxy epoxy glue. When it has hardened (two hours or less), remove from the table and sand the entire wing. Sand well, or until the wing skins are about $1/16$ " thick. Now wrap the center section with a 2" wide strip of fibre-glass, then add resin. Use Celastic, if you wish. Sand the wing again, then brush on two or three coats of clear dope. Decide whether or not you wish to silk the wing. (We did). Finish according to your preference. We sprayed on two coats of AeroGloss white, then laid out several strips of 2" wide masking tape on a glass table top. 2" divisions were marked off with a ruler, then cut with a triangle. The resulting 2" squares of masking tape were applied to the wing and tail. Clear butyrate was used to seal the edges, then AeroGloss Stearman red was sprayed over the entire wing. When removed, you have a rather bright checkered paint job.

And that's all there is to the construction. We cut out all the parts and made ourselves a do-it-yourself kit on Saturday evening, then put the Royal Coachman together on Sunday evening. All up weight should be about $21\frac{1}{2}$ pounds.

Our prototype balanced slightly aft of the point shown on the plans. With the Ancco servos we added three dead pencells to the battery compartment for ballast. With the light additional weight of the Royal MK multi servos, two of these were removed. If you have built the Royal Coachman according to plans, you will have no difficulty with initial flights. Use a $7/4$ prop on the Cox .09 and an $8/4$ on the .15. If your landing gear tracks straight and true, the Coachman will lift off with a slight tap of elevator in about fifty feet. As mentioned earlier in the article, flying this model with an .09 is simplicity itself — it is docile, yet will perform simple, basic maneuvers with six channel gear — an excellent trainer and sport ship for the Sunday flier.

But add a .15 and you've got a fast moving ship that's quite a handful. We hope you like ease of construction and the many hours of flying pleasure you'll get from the Royal Coachman. Drop us a line about yours.